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Stylized Facts and Incentive Effects Related to Claiming of Retirement Benefits Based on Social Security Administration Data

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Abstract

We rely on the Master Beneficiary File to document a number of facts regarding claiming of Social Security benefits and quality of date of birth data in administrative files. We then assess the impact of changes in retirement incentives that have taken place since 2000 on claiming. We find evidence of non-trivial misreporting or clerical errors in the dates of births that give rise to systematic patterns but nevertheless appear to be fairly random. We also confirm significant tendency to claim in January or on birthdays, but we find that these patterns are still sensitive to incentive effects. Relying on the discontinuity in the Early Entitlement Age that occurs for people born on the second day of any month, we find evidence that people do not have single-peaked preferences over claiming age: relaxing the early retirement constraint leads to acceleration of retirement by some people for whom the constraint would not be otherwise binding. One possible explanation for this pattern is a preference for retiring at one's birthday. We take advantage of a change in the full retirement age and find that there remains unusually large (relative to other birthdays) number of people who claim around their 65th birthday, supporting the idea that Medicare eligibility has an impact on claiming retirement benefits. Finally, we confirm that elimination of the earnings test in 2000 for those above full retirement age accelerated retirements and find that it also led to a significant weakening of the January effect in that group, bolstering the idea that the January effect is sensitive to economic incentives.

Authors' Acknowledgements

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1 Introduction

Our general objective is to estimate the effect of retirement incentives on the timing of retirement. The unique feature of this study is exploiting information based on administrative data covering the full U.S. population. The large sample and detailed information about the date of birth allows for utilizing variation in incentives that depends on the date of birth and exploiting retirement decisions on a monthly basis. We focus on three types of incentives. First, we propose a novel strategy for estimating the effect of monetary benefits. As discussed in detail below, peculiarities of calculation of Social Security retirement benefits imply that people born on the second day of the month can retire in the same month as those born a day or more earlier, but would then permanently receive somewhat lower benefits because the applicable number of reduction months applicable in computing their benefits would be higher. By taking advantage of the Master Beneficiary Records dataset covering 100% of the U.S. population, we can compare the decision to retire at the earliest possible age across people born on different days of the month and infer the impact of the monetary incentive.

Our second point of focus is to shed a light on the relevance of health insurance on the timing of retirement. Most individuals become eligible for Medicare at age of 65. Retiring before that date may mean in many cases giving up employer-provided insurance. Hence, individuals may have an incentive to delay the retirement date until age of 65 for that reason. Changes in the full retirement age change the financial incentives to retire at 65 and therefore provide an opportunity to disentangle the effect of full retirement age from the effect of availability of Medicare for the decision

to retire.

Third, the elimination of the earnings test in 2000 for people above the retirement age increased the incentive to accelerate claiming benefits and apply for benefits at the full retirement age.

Before focusing on incentive effects, we discuss the patterns of retirement and quality of the date of birth data available in the administrative databases maintained by the Social Security Administration. We find that there is non-trivial misreporting or clerical errors in the reported dates of birth but that the errors appear to be random. We further document patterns of retirement focusing on the so-called "January" effect, retirements at birthdays, changes in retirement dates depending on the date of birth and changes in these patterns over time.

2 Data

The data used in this project comes from the Master Beneficiary File. This is an administrative database containing information about the universe of beneficiaries. We obtained detailed tabulations from this database. Specifically, for any date of birth, the data contains the number of individuals (by gender), who retire at any particular month (only the month is relevant as payment of benefits and claiming take place on a monthly basis). This is the information that we use in our analysis: the unit of observation is the date of birth interacted with gender and for each cell of this kind we observe the number of people retiring at each month.

The data covers cohorts born between 1931 and 1945 and includes information

about the retirements that occurred up until march of 2008. However, information for all of 2007 and beyond appears incomplete (as evidenced by the substantial drop in the observed number of retirements) and hence we usually stop at the end of 2006. The range of cohorts covered allows for analyzing changes in the earnings test and expansion of the full retirement age.

While information comes from the administrative sources and pertains to the very basic demographic information, there are still reasons for concern about the quality of the data. First, information about the date of retirement is not entirely unambiguous as individuals may be transferred to Social Security rolls from DI or SSI, they can change their basis for claiming, may stop receiving benefits after having initially applied due to the retirement earnings test and so on.

Second, there are also problems related to the date of birth. Specifically, we observed that there are more than usual individuals who are born on certain dates such as the first of any month, days when the number of the month and the day are the same (1/1, 2/2, 3/3, 4/4 etc.) and 10^{th} and 20^{th} of any month. Most likely explanation of these patterns are clerical errors and, in fact as we discuss later, there are good reasons to believe that those individuals are not aware of the misrepresentation of their date of birth in the administrative data.

To illustrate the extent of this problem, we ran a regression of the log of the total number of retirements observed in the data on dummies for gender, the year of birth, the month of birth and the day of birth. If indeed dates of birth, as reported in administrative data, were randomly distributed over the month, the coefficients on the day dummies should be all close to zero. The estimated coefficients on the

day-of-the-month dummies together with two standard-error bounds are shown on Figure 1 (the omitted category is the third of the month). The coefficient on the dummy for the first of the month is large and statistically very significant. It implies that, apparently, about 5% more than expected individuals appear to be born on the first day of a month. Other statistically significant coefficients correspond to the 10th, 15th and 20th of the month.

Close inspection of the data reveals additional inconsistencies. Including additionally dummies for the days of the month that are equal to the number of the month (1/1, 2/2, 3/3) results in statistically significant and positive coefficients for January 1st, February 2nd, March 3rd, April 4th, May 5th, October 10th, November 11th and December 12th (with dummies for the 1st, 10th, 15th and 20th remaining significant).

Thus, it appears that dates of birth in the administrative data are not smoothly distributed over the course of the year but rather feature unusual density at fairly regular dates. While there may be retirement incentives to claim that the date of birth is January 1st rather than some other day, it is hard to come up with a good reason for why almost 4% more than expected individuals were claiming to be or actually were born on April 4th. Hence, it appears that there are simple clerical errors in the data that do not appear to be related to any incentives. This observation does not of course eliminate the possibility that some of the errors are in fact intentional and reflect the attempt to game the system. For example, being born on the first or the second of the month allows for retiring earlier than any later day and being born on January first is treated as if one was born in the prior year.

To investigate the possibility that the mistakes are intentional, we observed that individuals may have an incentive to report the date of birth as the first of the month in order to claim benefits earlier. If that was the case, then we would expect that the number of individuals whose date of birth falls on the first of the month and who retire at the Early Entitlement Age is higher than for other days. Figure 2 shows coefficients from regressing the log number of people retiring at the early entitlement age on day, month, year and gender dummies. There is no evidence that there is any effect corresponding to the first of the month. This suggests that the additional people who are observed as being born on the first do in fact retire at later dates and hence do not take advantage of the benefit that earlier date of birth accords. That does not fully exclude the possibility of there being manipulation because conditional on any date of retirement there is a benefit of an earlier date of birth due to a smaller number of reduction months, but it nevertheless would be surprising if there was no response on the month of claiming margin. Perhaps the most striking feature of Figure 2 is the effect on the second of the month. This will be the topic of the next section. It is also interesting to observe that there appears to be an effect over the course of the month, with individuals born in the latter part of the month being more likely to delay retirement further. Figure 3 shows what happens in the following month (i.e., one month after early eligibility) and there is a clear reversal of the patterns then.

2.1 January and Birthday Effects

As will be discussed a bit later, the presence of a tendency to retire in January is an important complication in understanding incentive effects on retirement dates. Before turning to these issues, we will first describe the magnitude and changes in the January retirements.

Figure 4 shows the number of retirements by month of the year. It is obvious that the number of retirements in January significantly exceeds the number of retirements in any other month. In fact, it is approximately twice as large.

The presence of the January effect is more than just a curiosity, because it is likely to affect how people respond to small changes in incentives. Much of empirical work hinges on the assumption that small changes in incentives imply small changes in behavior. However, if people exhibit strong tendency to retire in January, they will retire in January for a range of retirement benefits parameters. When the change in incentives goes beyond that range, it is possible that their decision will not be adjusted just a little bit but rather that they either will choose to retire at their optimal date other than January or they will shift their retirement date by a full year to the following or preceding January. Such lumpy responses require careful modeling because they violate the implicit assumption in standard econometric frameworks that marginal changes have marginal effects.

The second salient feature of retirements is retiring at one's birthday. Figure 5 shows the number of retirements over all years in the sample that occur at ages between 62 and 2 months through 64 and 11 months. There is a clear pattern of an increase in retirements occurring at or right after one's birthday. The presence

of such a pattern is interesting in the context of understanding the determinants of bunching of individuals at the early and full retirement dates: as those dates correspond to birthdays, the preference for retiring on a birthday may contribute to the magnitude of retirements at those times.

3 Variation in retirement benefits depending on the date of birth

Individuals can choose to retire as early as at the age of 62 (early entitlement age — EEA), foregoing part of their benefits that depends on the number of months until the full retirement age (FRA). For example, for cohorts born when FRA was 65 (cohorts born in 1937 or earlier), for most people, retiring at the earliest possible date corresponds to a reduction of benefits by 35 months multiplied by the appropriate reduction factor.[1] Why 35 and not 36 months?[2] Retirement benefits can be paid as early as in the first month when a person is 62 *throughout* the whole month. On the other hand, the person can receive full benefits *starting with* the month when (s)he reaches the full retirement age. For most people, the month following the month when one reaches a given age is the first month when one is of that age throughout the month, hence explaining why it is 35 and not 36 month reduction. More interestingly for our purposes, there is an exception to that rule that applies to people born on

[1] The reduction factor of 5/9% applies to the first 36 months so that benefits are reduced by 20% if somebody retires 36 months before turning 65. Each additional month of early retirement (possible for cohorts born in 1938 or later when full retirement started to increase over 65, reduces benefits by 5/12%.

[2] See POMS Section RS 00615.015 - How the Day of Birth Affects Benefits `http:/policy.ssa.gov/poms.nsf/links/0300615015`for more detailed discussion.

the second of the month. Social Security follows English common law that finds that a person attains an age on the day before the birthday. As a result, people born on the first of the month as treated as those born in the previous month (and those born on January 1st are treated as if they were born in the previous year). People who are born on the second of the month, attain any given age and are of that age throughout the whole month in the same month. As a result, their early retirement date is the same as the early retirement date of those born a day earlier but their full retirement date is the same as that of those born a day later. Hence, if they choose to retire at the earliest possible date, they can retire a month earlier than a person born one day later and at the same time as the person born one day earlier, but they will have their benefits reduced by 36 months.

We will represent the reduced form of the utility from retiring at a given age a for a person born on day d as a function of benefits $b_d(a)$ as $u_d(a, b_d(a))$. It is a reduced form of utility because we are subsuming other effects (such as changes in the value of employer provided pensions, disutility of working for an extra month, the effect of resulting earnings on consumption and so on) in the dependence of u on a and we accounting for the impact of working an extra month on the benefits through a reduced form function $b_d(a)$. The optimization is performed over a and is subject to the constraint that $d + a \geq e_d$ where e_d is the earliest date when a person born on date d can retire. For individuals who choose to retire at the earliest possible date e_d, the constraint is binding $\lambda = -\frac{du}{da} \geq 0$, where λ denotes the multiplier on the early retirement constraint.

Consider what happens when d corresponds to the second of the month. An

increase in d corresponds to a change in e_d by the full month accompanied by a small and arguably negligible changes in schedules u_d and b_d due to the one day difference in the date of birth.[3] Hence, by comparing people born on the second with those born on the third and observing that a month of a reduction in the retirement age corresponds to a reduction of benefits by 5/9% or 5/12% (respectively, for those born earlier than 1938 and those born after than 1937) we can estimate the *population* elasticity of retirement with respect to a percentage change in retirement benefits. In other words, we can estimate how many individuals who locate on the constraint would choose so even if the constraint was not binding.

The black lines on figure 6 show the fraction of people retiring at the EEA as a function of the date of birth. Red dots correspond to the second of the month. It is fairly clear that people born on the second of the month retire at the earliest possible age more rarely than others. At the same time, given that if they retired a month later they would have faced exactly the same benefit reduction as anyone else retiring at the earliest date, it is clear that only very few of them behave as if the constraint was not binding.

A more formal measure of the size of the effect is presented in Table 1. We show the results of a regression of the log of the number of people retiring on the earliest possible day (the unit of observation is the day of birth) on a set of year, month, sex and day-of-the-month dummies. The omitted day-of-the-month dummy is for the

[3]There are cases where the effect of a one day difference in the date of birth may not be negligible such as when it corresponds to crossing a threshold date for schooling or when there is a reason to believe that population reported as being born on a given date is for some reason different. As was discussed earlier, the latter factor is potentially an issue due to apparent errors and/or misreporting of the date of birth.

first of the month and the coefficient of interest is the dummy for the second-of-the-month. As can be easily expected based on the graphical representation of the date, the dummy for the second-of-the-month is negative and very significant. Among those born on the second of the month, approximately 6.6% fewer people choose to retire at the earliest date than among those born on other days. This effect is present for both men and women, albeit it appears to be significantly weaker for women.

Cohorts born prior to 1938 faced the retirement age of 65 and the benefit reduction for retiring a month earlier was equal to 5/9% of benefits, while the reduction for cohort born after 1937 is 5/12% of benefits (because benefit reductions for months beyond 36th month are lower). Hence, one may expect that the effect should be stronger for the older cohorts. While the coefficient is indeed more negative, the difference is very small. In not reported results of regressions year-by-year, there is no clear annual pattern. This pattern casts doubt on benefits as the explanation of these patterns. A potential confounding factor might be due to the fact that the overall benefit reduction for retiring at the EEA was higher (and increasing) starting with the 1938 cohort. As a result, the composition of the population retiring around the EEA and hence its responsiveness might have changed.

Another possibility is that the effect does not reflect to a response to economic incentives, but rather that not all people who are born on the second of the month realize that they could retire earlier than others or follow a rule-of-thumb behavior. A piece of supportive evidence for this fact is that analogous regression with the log of the number of people retiring one month after the entitlement date as the dependent variable implies that those born on the second of the month are over 70%

more likely to retire a month after EEA than those born on the days that follow. One explanation of this pattern may be of course that there are more that many more people who optimally want to choose age of 62 years and one month relative to those who want to optimally choose retirement age 62 years and one month, but the magnitude of this effect appears extremely large. Figure 7 illustrates it. The number of people born on the second and retiring one month after 62nd birthday is large and seemingly out-of-line with retirements in the months that follow.

Another way of testing whether the response is purely due to incentive structure is to note that the incentives to retire at age older than 62 years and 1 month are identical for those born on the second and others. Hence, if individuals optimize their retirement age subject to a constraint (and if the objective function is convex) there should be no difference in behavior after that age. Similarly, retirements at age of 62 by those born on the 2nd should simply reflect shifting from retirements from age of 62 and 1 month and that can be easily tested by summing the number of people retiring at 62 or 62 and 1 month to see whether it varies by the day of birth.

Table 2 shows the results of corresponding regressions. The number of people retiring at age 62 or 62 and 1 month is higher among those born on the second of the month. This by itself is inconsistent with everybody optimizing subject to having unimodal preferences over retirement age: relaxing the early retirement constraint should not change the number of people retiring at or before the unrelaxed constraint. The observed pattern appears to indicate that some of the people who would have retired after the EEA when the EEA is 62 years and 1 month, choose to retire at or before 62 years and 1 month after the EEA is reduced by one month. The presence

of such an effect is further corroborated by the following rows of Table 2 that show statistically significant reductions in the number of people retiring 2, 3 and 4 months after their 62 birthday. There is also some evidence that the cumulative effect might even persist as long as a year after 62 birthday, however there is also some evidence that the number of people with the day of birth reported as the second of the month is slightly elevated. To control for this effect (and preceding its explanation provided later), similar regressions can be ran using the share of retirements in the overall number of retirements after age of 62. These results are reported in Table 3. They show similar pattern as discussed above: elevated number of retirements around the relaxed constraint and reduction in the number of retirements in the following three months; but they no longer show a longer term cumulative effect. Hence, it appears that some of the individuals who would have retired strictly after the EEA when it is 62 years and 1 month, choose to accelerate the retirement when EEA is reduced to 62 years.

The leading explanation for this finding is the presence of a birthday effect. Individuals born on the second are provided with an opportunity to retire on their birthday while others are not. Some of them appear to take advantage of it and accelerate their retirement by a number of months.

4 Changes in retirement patterns following an increase in FRA

Starting with the 1938 cohort, retiring at the age of 65 is no longer associated with reaching the full retirement age. Hence, absent birthday effect or other reasons to retire precisely at one's birthday, we should no longer expect an elevated number of retirements at that date. As argued earlier, people do have a tendency though to retire on birthdays. Figure 9 shows the number of retirements at 63rd through 66th birthdays by the date of birth. It is clear that following the increase in the full retirement age, the number of retirements at the 65th birthday remains elevated although of course still the number of retirements at that birthday drops precipitously as people postpone retirement to the full retirement age.

On Figure 10 we show the (log of) the number of retirements by 1936 through 1941 cohorts. The key observation is that the number of retirements at or just before 65th birthday is significantly elevated for all cohorts and does not weaken or shift very much for later cohorts that are affected by the increase in the full retirement age. The magnitude of the retirements around 65th birthday dwarfs slight increases in retirements around 63rd or 64th birthdays. Figure 11 shows just the number of retirements in the proximity of the 65th birthday. While there is possibly a little bit of a decline in retirements occurring just before the 65th birthday, the effect is not very large and the tendency to retire just before or at 65th birthday remains very strong. Therefore, it does appear that the neighborhood of age of 65 remains an important point for retirements, despite the peak of retirements shifting to the FRA. This

effect is much stronger than the effect at earlier ages and the fact that the pattern of retirements preceding 65th birthday does not change much after FRA increases suggests that retiring around 65th birthday has intrinsic value to individuals. The leading candidate for explaining the effect of this kind is availability of Medicare.

5 Impact of Elimination of the Earnings Test on the January Effect

Figure 12 shows the coefficients from a regression of the log of the number of retirements by date of birth and age at retirement, on day, month and year of birth dummies, gender dummies and a set of dummies for the date of retirement falling in January interacted with the year of birth. Two regressions were estimated: one on retirements occurring between ages of 62 and 64 and another on retirements occurring between 64 and 66. All of the coefficients are large and positive, reflecting that the January effect is well and alive for all cohorts. However, the coefficient falls dramatically with the first cohort that was no longer subject to the Earnings Test after turning 65 - the 1935 cohort - while no comparable effect is present for those retiring at earlier ages. A spike in January retirements occurring in 1934 most likely reflects that individuals who were delaying retirement after turning 65, accelerated it to take advantage of the elimination of the earnings test. These patterns strongly suggest that the preference for retiring in January can be dominated by economic considerations.

6 Conclusion

In this paper we presented initial and not yet complete analysis of the monthly patterns of retirements and linked them to retirement incentives. By relying on the administrative data, we were able to exploit minor differences in retirement incentives that are present depending on the precise day of birth and show suggestive evidence of "lumpy" responses. We also documented the presence of significant birthday and January effects. Despite the general presence of the birthday effect, we showed that retirements around age 65 are unusual and in fact do not change much following the increase in the FRA (other than, of course, the shift of the peak of retirements to the new FRA). This suggests that the 65th birthday plays an important role for reasons not related to the FRA, with the leading candidate being eligibility for Medicare. As a result, it appears likely that retirements are in fact postponed for health insurance reasons. Finally, we showed that the peak of retirements occurring in January is in fact responsive to economic considerations, in particular that it did respond to elimination of the earnings test.

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Table 1: Early retirement responses

	All	Men	Women	Pre-1938	Post-1937
2nd of the month	-0.0663111	-0.0771292	-0.0554929	-0.0673221	-0.065312
	(0.004195)***	(0.0053306)***	(0.0053131)***	(0.0053435)***	(0.0056082)***
3rd of the month	0.0000993	-0.0022925	0.0024911	0.003209	-0.0029738
	(0.004195)	(0.0053306)	(0.0053131)	(0.0053435)	(0.0056082)
4th of the month	0.0000324	-.0003052	0.0003701	0.0042392	-0.0041661
	(0.0042033)	(0.0053411)	(0.0053236)	(0.0053435)	(0.0056304)
N	10234	5117	5117	5114	5120
R^2	0.6329	0.6340	0.7224	0.6856	0.5909

Table 2: Structure of early retirement response — number of retirements

	2nd of the month effect relative to 3rd of the month	
	Direct effect (at that month)	Cumulative effect (since 62)
Retiring at 62 or 62 and 1 month		0.0166127
		(0.0041257)***
Retiring at 62 and 2 months	-0.0837979	0.014394
	(0.0183157)***	(0.0041959)***
Retiring at 62 and 3 months	-0.0469463	0.0122686
	(0.0204038)**	(0.0041237)***
Retiring at 62 and 4 months	-0.0453151	0.0106497
	(0.0220328)**	(0.0041226)***
Retiring at 62 and 5 months	0.0178099	0.0106271
	(0.0225146)	(0.004097)***
Retiring before 63rd birthday		0.0099118
		(0.0040506)***
Number of people overall		0.0076231
		(0.0044366)*

Table 3: Structure of early retirement response — share of retirements

	2^{nd} of the month effect relative to 3^{rd} of the month	
	Direct effect (at that month)	Cumulative effect (since 62)
Retiring at 62 or 62 and 1 month		0.0042864
		$(0.0015547)^{***}$
Retiring at 62 and 2 months	-0.001457	0.0028294
	$(0.0006033)^{**}$	$(0.0015954)^{*}$
Retiring at 62 and 3 months	-0.0009837	.0018456
	$(0.0004793)^{**}$	(0.0016346)
Retiring at 62 and 4 months	-0.0007256	0.0011200
	$(0.0004092)^{*}$	(0.0016646)
Retiring at 62 and 5 months	0.0000163	0.0016646
	(0.000351)	(0.0.0016646)
Retiring before 63^{rd} birthday		0.0016646
		(0.001786)

Figure 1: Log of the number of retirees by day of the month (coefficients on day-of-the-month dummies)

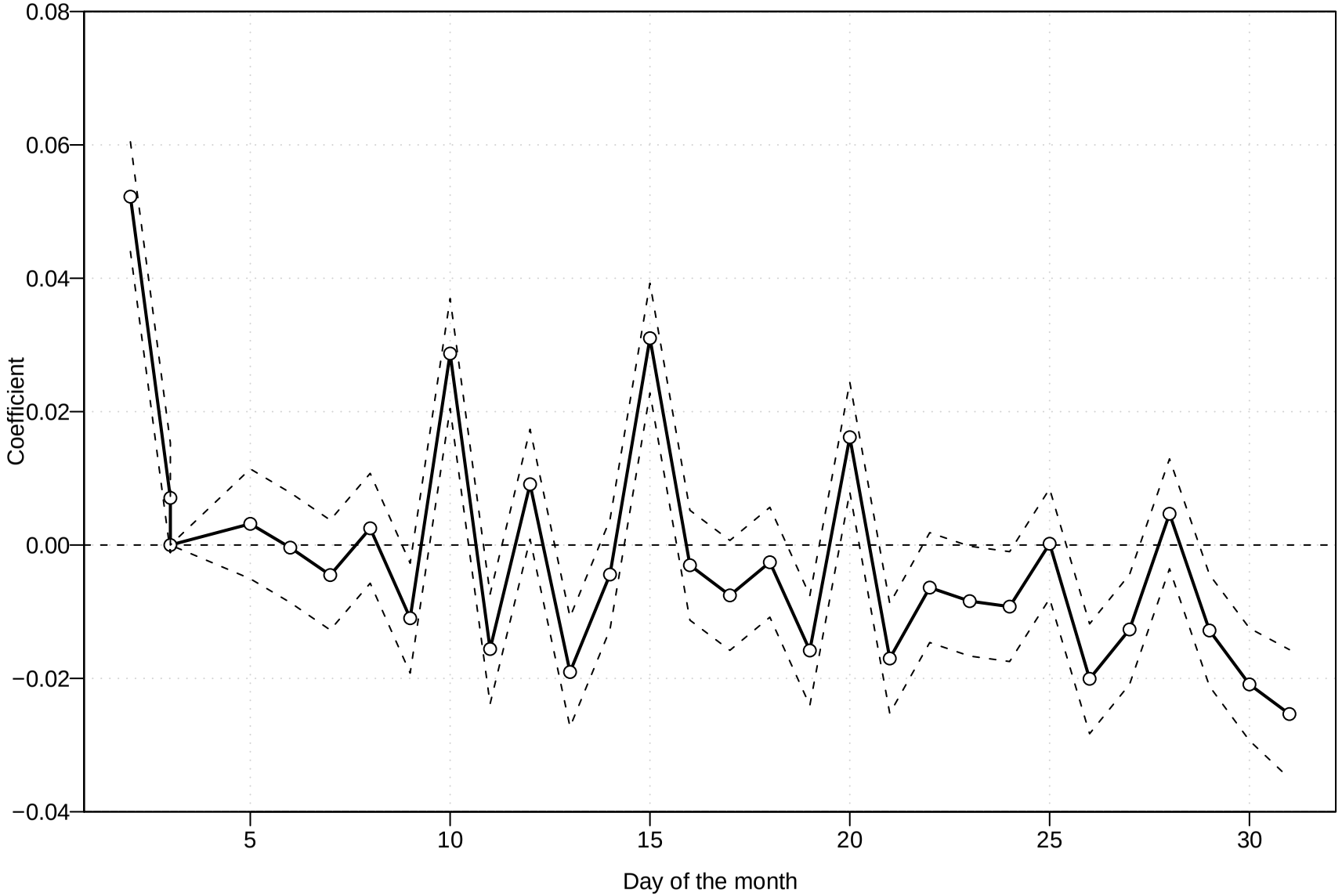


Figure 2: Log of the number of retirees retiring at the EEA (coefficients on day-of-the-month dummies)

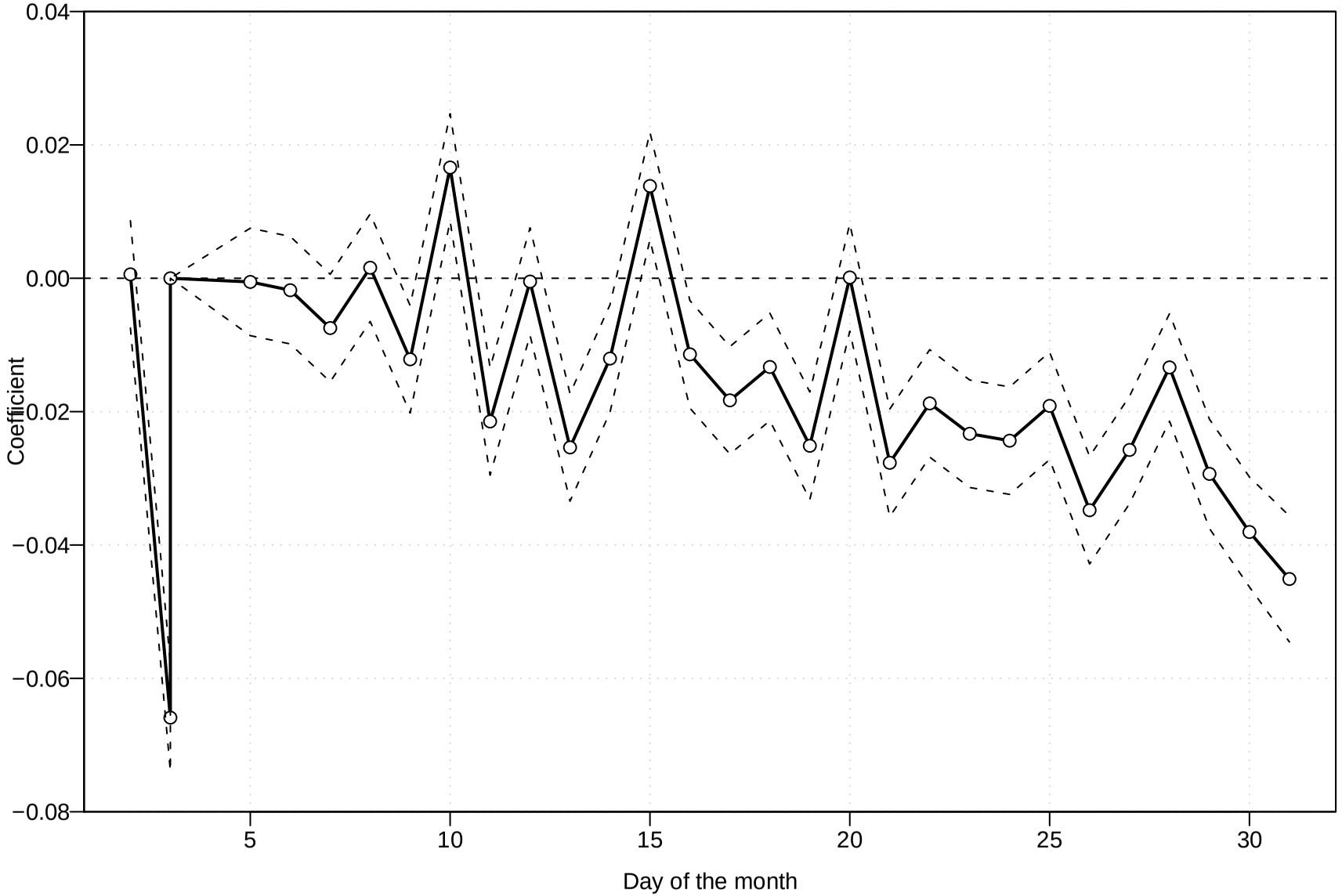


Figure 3: Log of the number of retirees retiring one month after EEA (coefficients on day-of-the-month dummies)

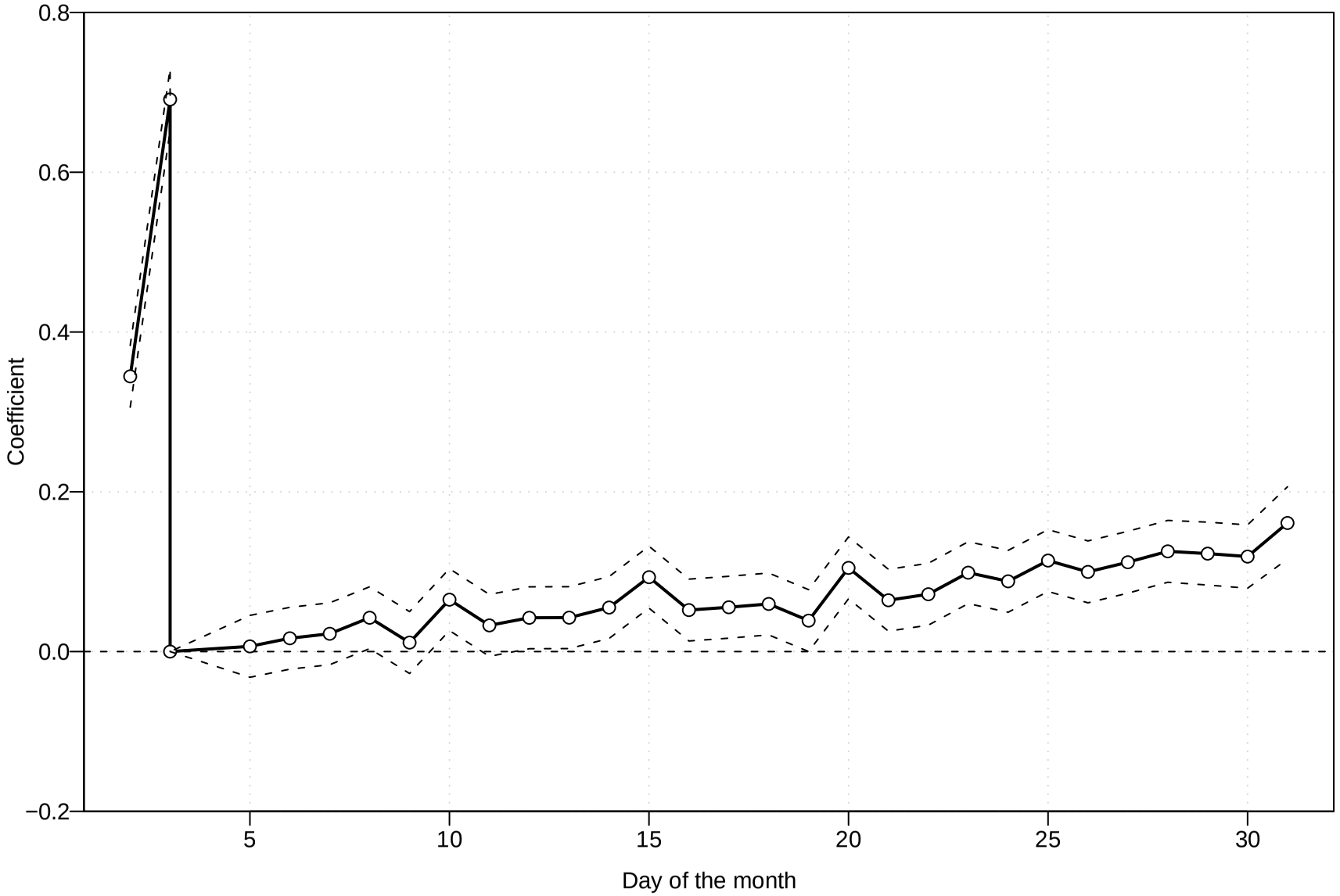


Figure 4: Retirements by month of the year

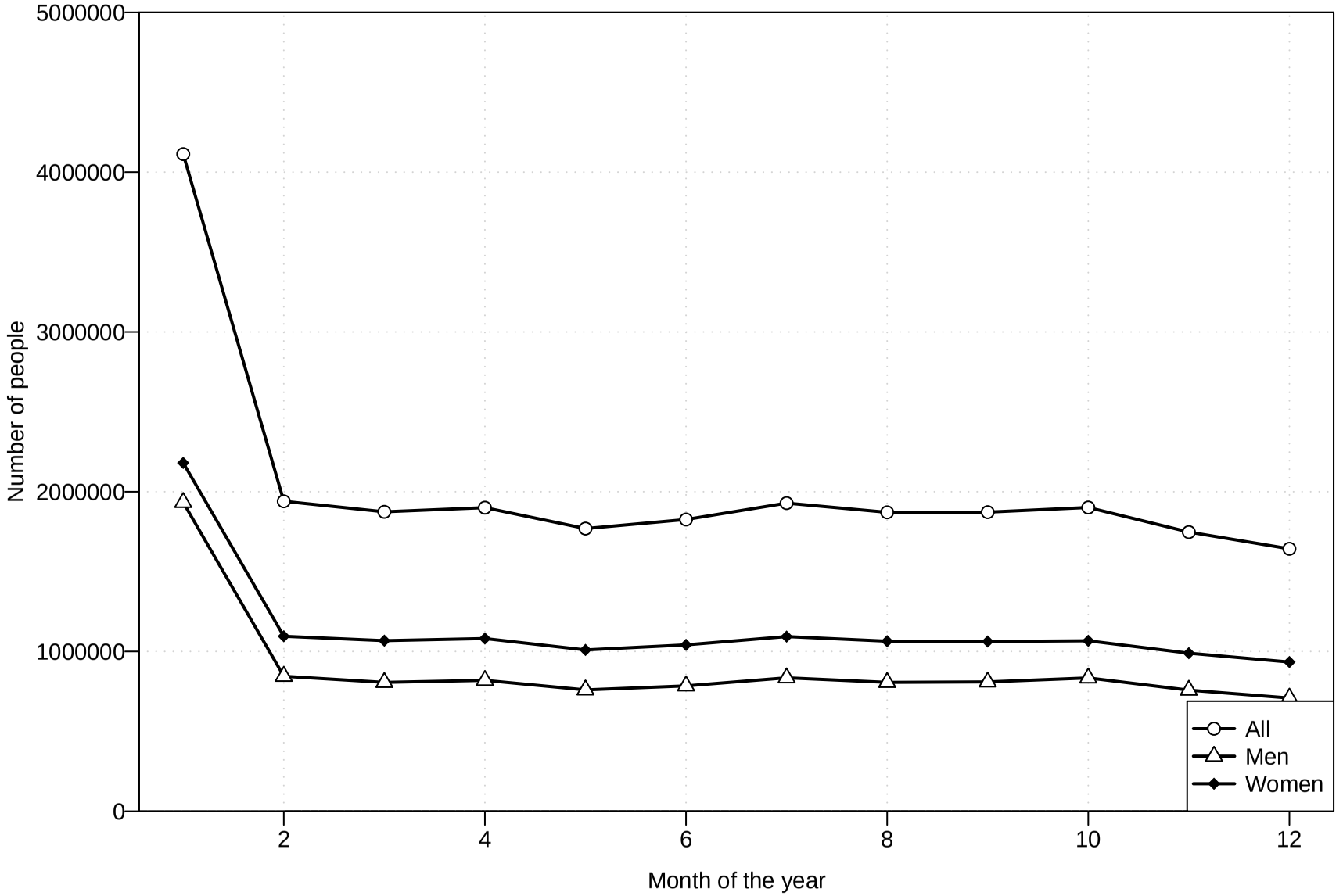


Figure 5: Retirements by age

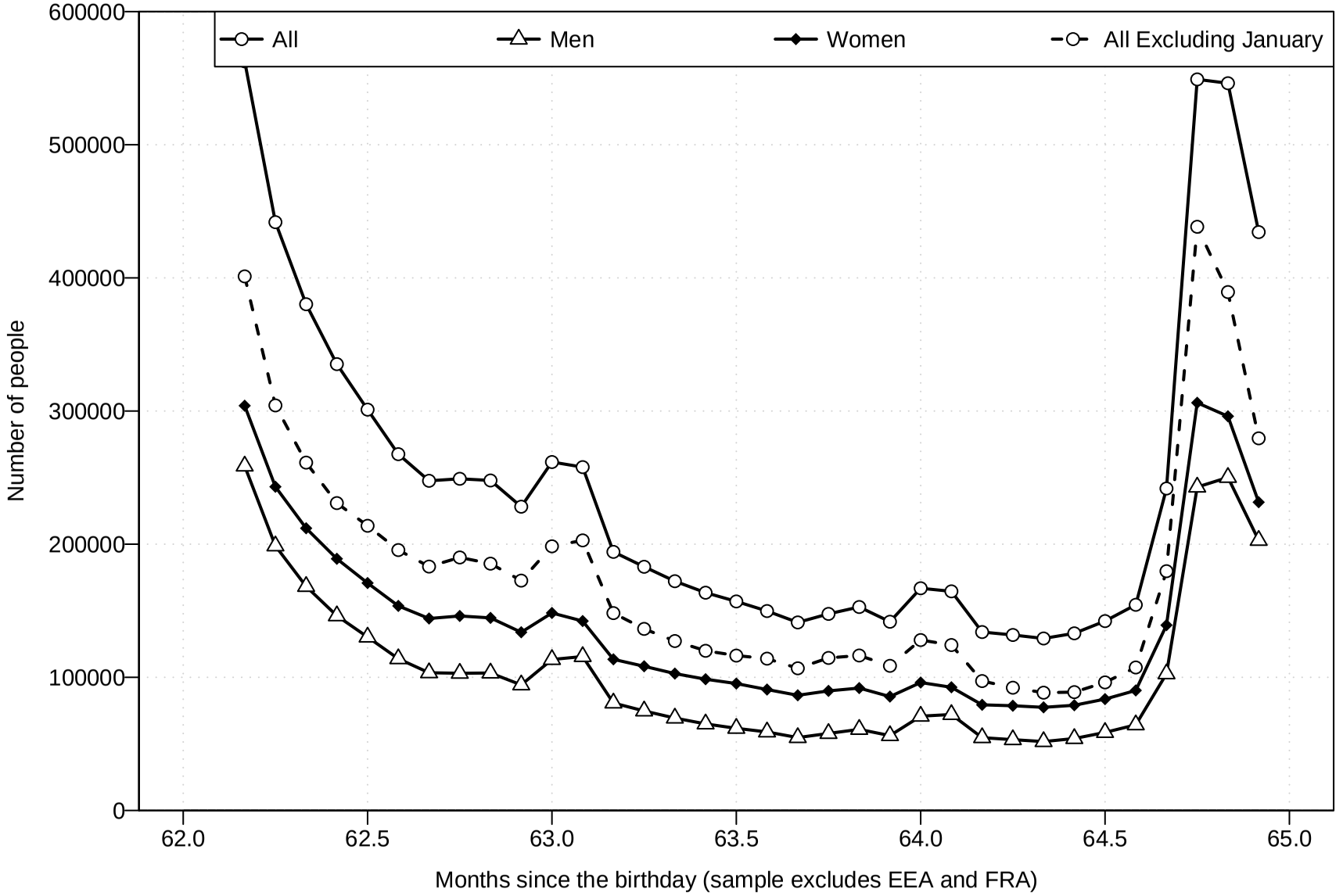


Figure 6: The number of people retiring at the early retirement age (men only)

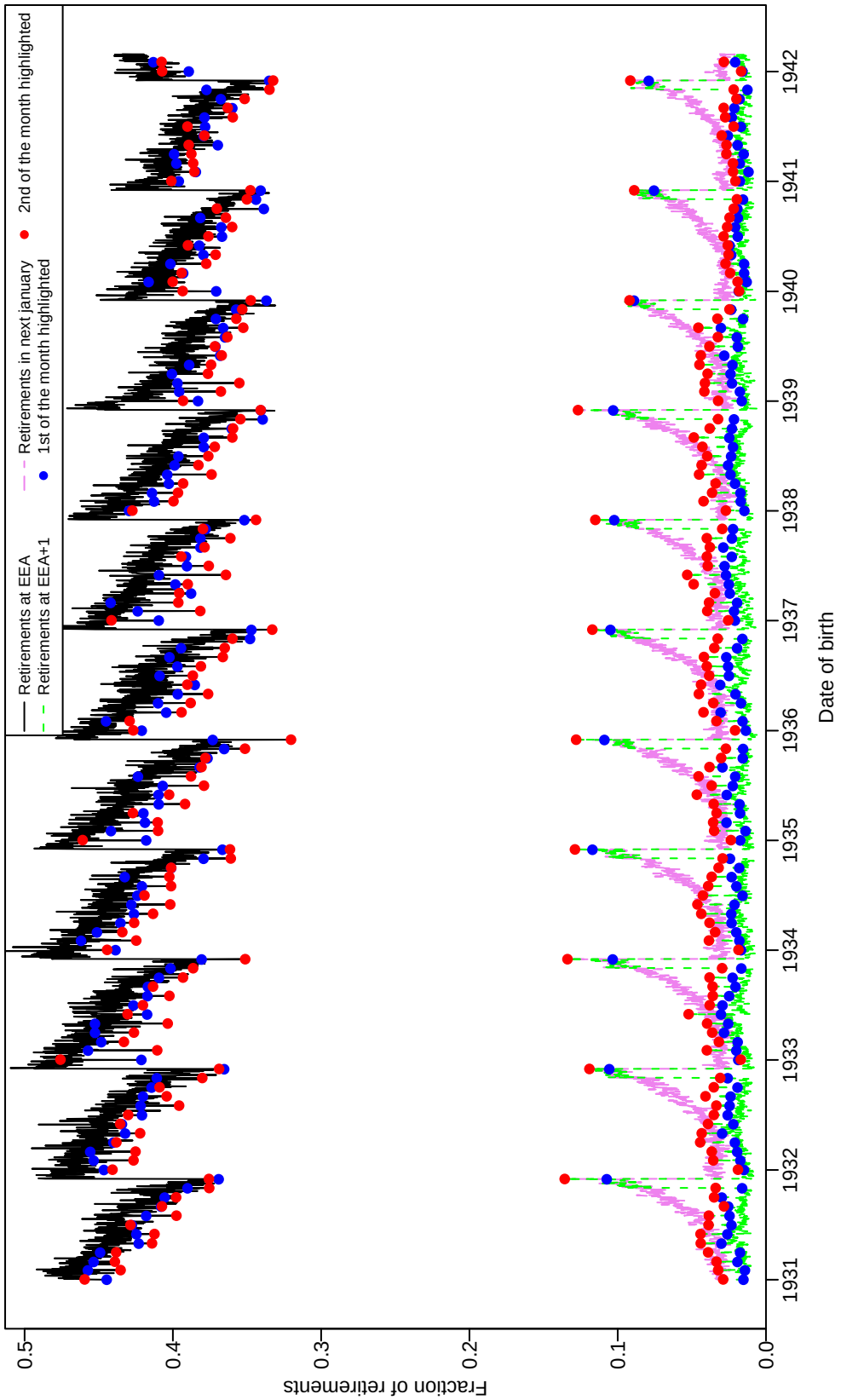


Figure 7: Age at retirement by the day of birth

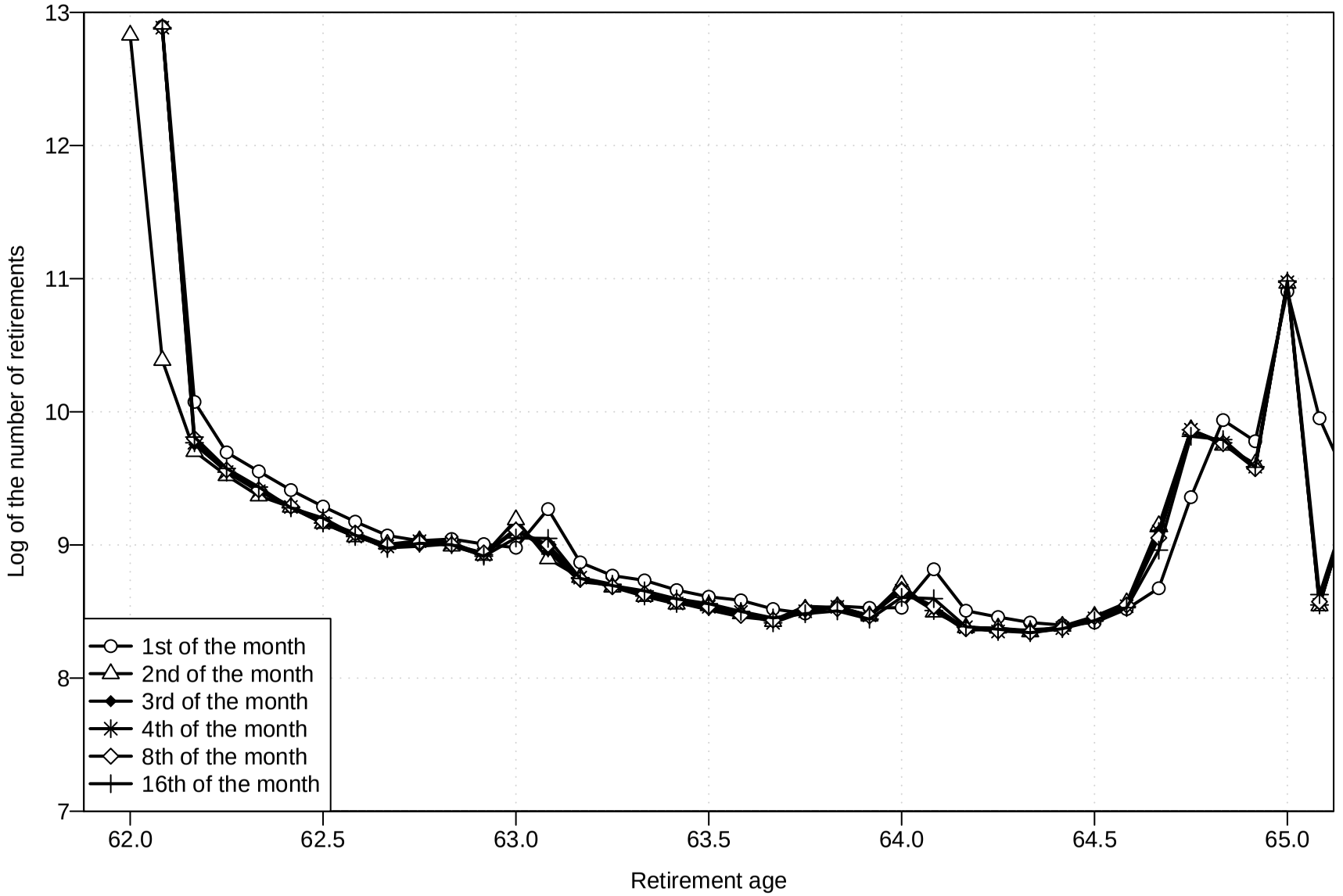
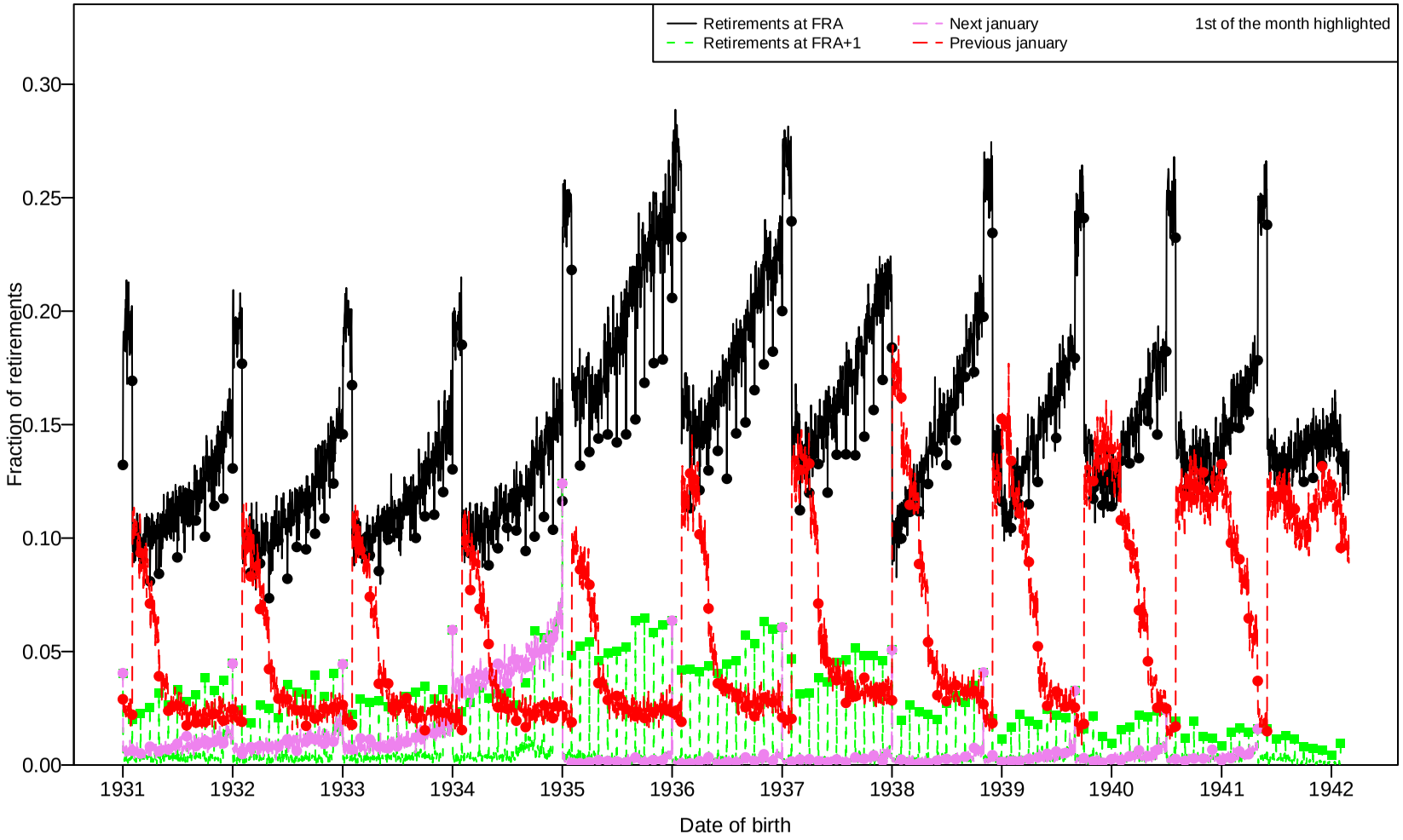


Figure 8: Retirements at or around full retirement age (men only)



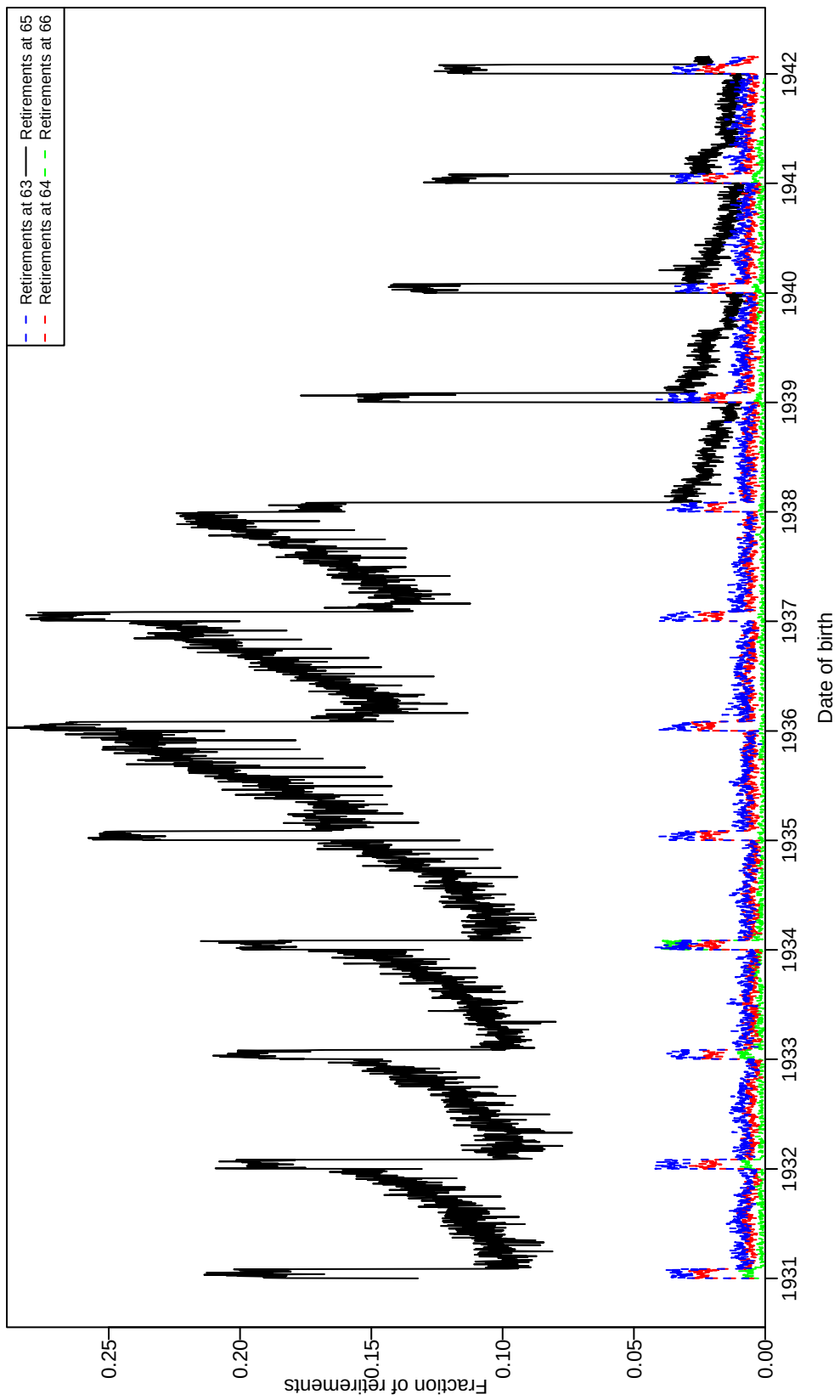


Figure 9: Retirements at 65 (men only)

Figure 10: Age at retirements by cohort

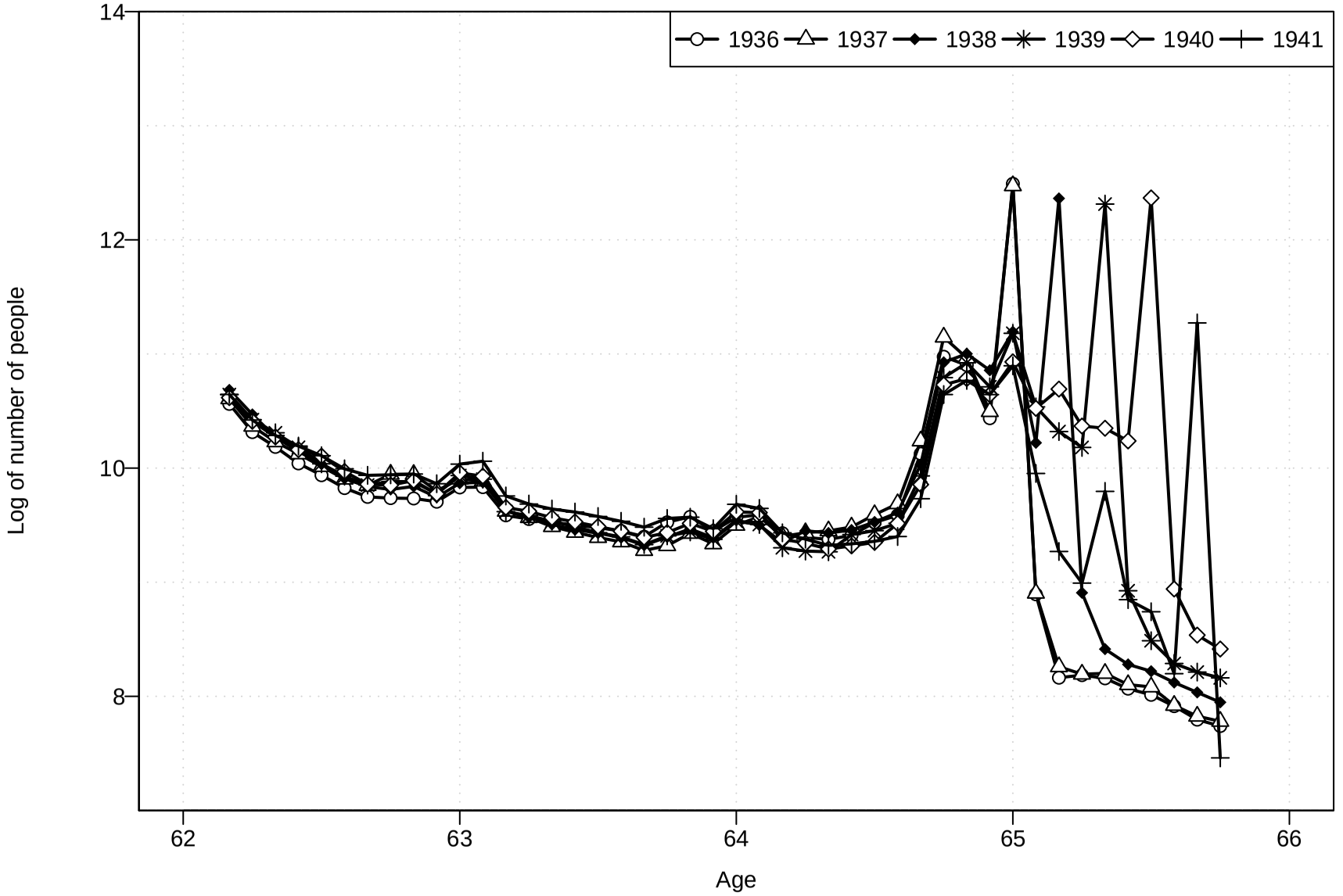


Figure 11: Retirements close to 65th birthday by cohort

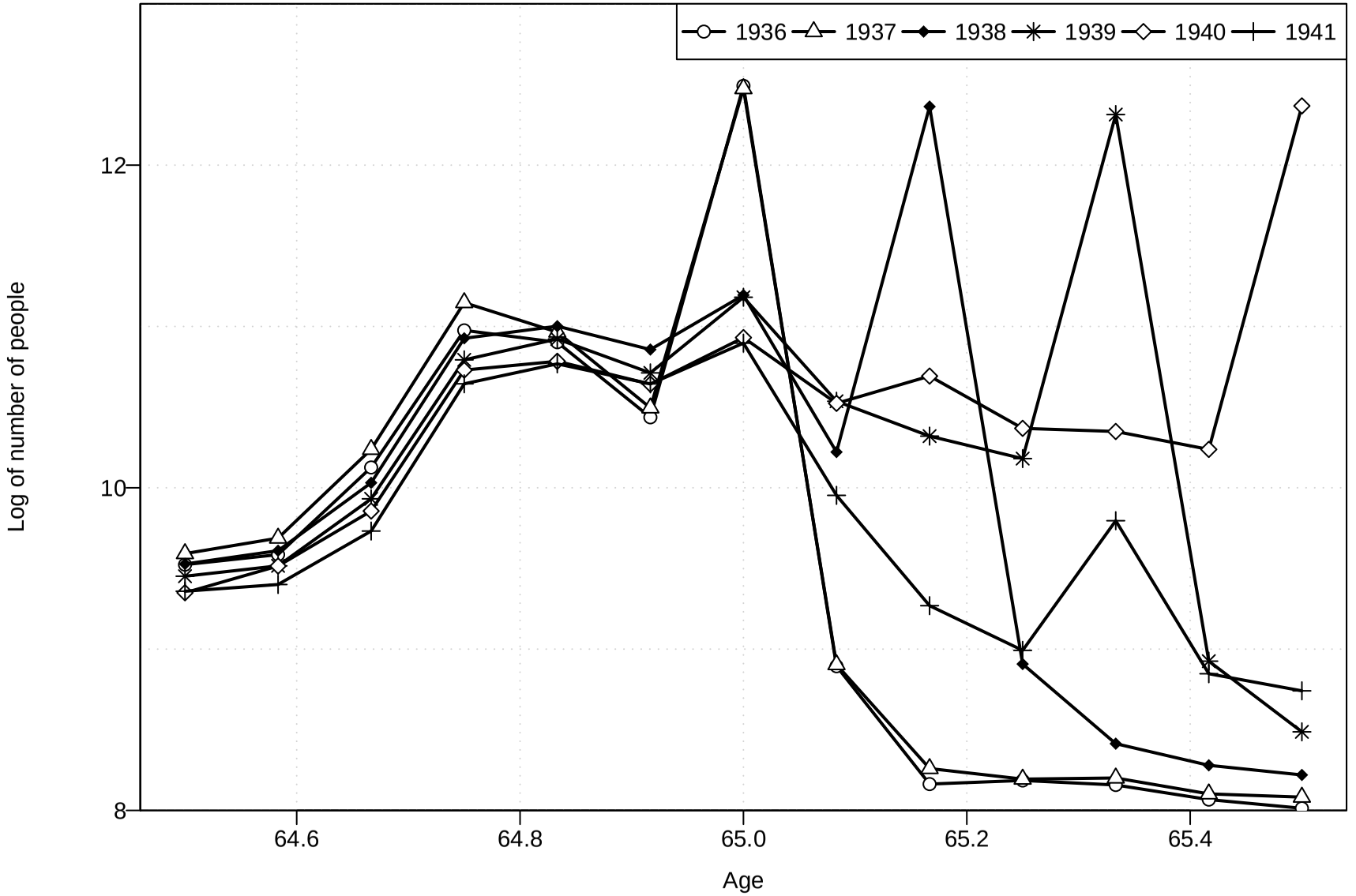


Figure 12: Estimated January Effect By Year of Birth